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U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Docket No. 50-206
Special Report, License Condition 3.M(4)
Reactor Vessel Thermal Shield Monitoring
San Onofre Nuclear Generating Station, Unit 1

References: 1) Letter, F. R. Nandy (SCE) to USNRC Document Control Desk, "The Revised Final Acceptance Criteria for the Thermal Shield Monitoring Program," dated March 19, 1990

2) Letter, H. B. Ray (SCE) to USNRC Document Control Desk, "Amendment Application No. 181," dated April 10, 1990.

Pursuant to License Condition 3.M, paragraph (4) a), SCE telephonically notified the NRC on May 24, 1990, that on May 23, 1990, San Onofre Unit 1 had exceeded the reporting requirements of the subject license condition. As a result of this event, SCE increased the monitoring frequency from a minimum once per week to five days per week until the condition stabilized.

This letter provides a written 14-day report, pursuant to license condition 3.M, paragraph (4) b), and provides the results of our evaluation and our future plans and actions.

BACKGROUND OF THE THERMAL SHIELD MONITORING PROGRAM

The neutron noise / loose-parts detection system is used to monitor the condition of the reactor vessel thermal shield throughout Cycle X. Details of this program are described in the referenced letter.

The neutron noise is monitored weekly at four locations around the Reactor Vessel on eight excore power neutron flux range detectors. The monitoring data is analyzed for cross power spectral density including phase and coherence. The analysis of the data provides information on the movement of the components within the reactor vessel. The signals from a detector vary within a band between one measurement and the next as the result of the random nature of the signal and other variables which could affect the signal level. As a result, one isolated measurement is not, in itself, particularly significant. As data is collected, however, a trend is established for each detector.

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Baseline trends were established at the beginning of Cycle X for each of the eight detectors. Based on these trends, criteria were established which are 200% above the baseline signals over frequency bands of 0.3 hertz to 19.0 hertz for ion chambers and 0.3 hertz to 13.5 hertz for fission chambers.

Since December 1989, SCE has been trending two detectors (1208 A&B) between 7.5 and 9.5 hertz twice per week as the result of their exceeding a level which is 80% above the baseline. The results indicate a slight increase in the RMS value over these frequencies from December 1989 to February 1990. Since mid-February 1990, the RMS value has remained relatively constant.

A contributor to the general increase in signal level is a change in the scale factor between the source of the noise and the signal level which occurs as the result of increasing moderator reactivity coefficient as the core is expended. As the core burnup increases, this effect becomes larger in magnitude with the decreasing boron concentration.

INCREASED NEUTRON NOISE

A surveillance performed on May 23, 1990 found that the signal from one of the eight detectors (1208B) exceeded the 200% criteria only in the 8.2 hertz frequency band.

This increase in the detector signal is associated with a shutdown and startup of Unit 1, which was returned to full power operation on May 20th. In previous shutdowns and startups, a similar increase has been observed in the 8.2 hertz band. Previous increases closely approached but did not exceed the reporting requirements of the license condition. Following previous startups, this increased signal level stabilized near the pre-shutdown level after a few days of operation. As mentioned above, SCE has been monitoring and trending the signals from the eight detectors five days per week since May 24, 1990. On May 24th, the signals were below the 200% criteria and continued to decrease until on May 29th the signals had dropped to approximately the levels observed prior to the reactor trip.

The signal increase observed from detector 1208B on May 23rd, is believed to be a random "spike" which, when added to the slowly increasing trend in all of the signals due to the effects of core burnup (i.e., increasing moderator density coefficient and fuel depletion), resulted in exceeding the 200% criteria. This single instance of exceeding the criteria is not believed to be indicative of thermal shield support degradation since: 1) appreciable changes in the condition of the support system would have shown up as a shift in frequency, and 2) at least one other radial location would have shown an increase in amplitude and/or a frequency shift. Additionally, the acoustical loose parts monitoring system data has been evaluated and no changes have been noted.

Due to the underlying increase in the signal trend, it is possible that there may be other instances of exceeding the 200% criteria before Unit 1 begins its Cycle X refueling and thermal shield support repair outage.

SUMMARY AND FUTURE ACTIONS

Since exceeding the 200% criteria on May 23, 1990, detector 1208B and the other seven detectors have not subsequently exceeded the 200% criteria and have leveled out at approximately the same amplitude which has been observed since February 1990. As a consequence, SCE has concluded that the high measurements found on May 23, 1990 were of no safety significance and that the thermal shield remains stable.

SCE will continue to record neutron noise and evaluate thermal shield motion twice a week until the thermal shield supporting system is replaced in accordance with the plan described in Reference 2.

If you require any additional information, please so advise.

Sincerely,

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cc: C. W. Caldwell (USNRC Senior Resident Inspector, Units 1, 2 and 3)
J. B. Martin (Regional Administrator, USNRC Region V)